

Accelerometer for Space Applications Based on Light-Pulse Atom Interferometry, Phase I

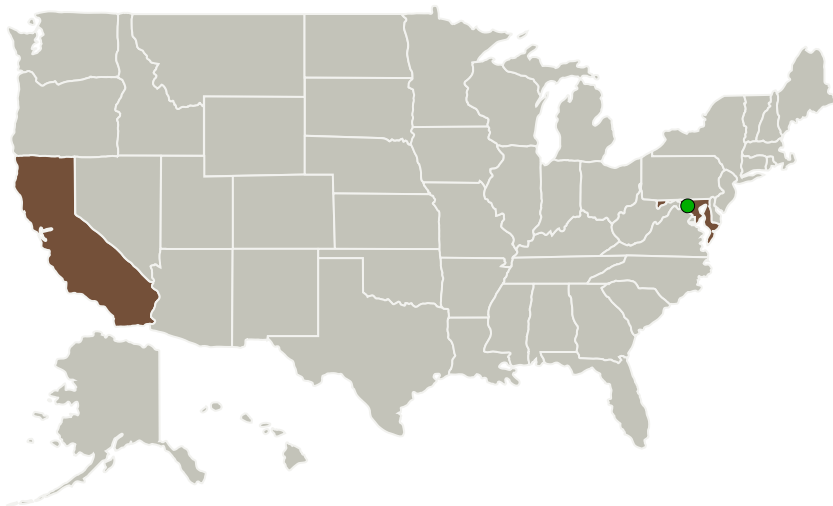
Completed Technology Project (2012 - 2012)



Project Introduction

We propose to design a compact, high-precision, single-axis accelerometer based on atom interferometry that is applicable to operation in space environments. Our design will emphasize reliable operation and minimization of the acceleration noise floor, bias drifts and scale factor instability. Laser system reliability will be a major consideration in the design. The sensor design will be capable of demonstration and testing on a low-dynamics platform under earth gravity. Phase I will result in block diagrams and detailed 3D CAD models of the sensor head, laser system and electronic control system. We will validate the sensor design by developing error models taking into account variations in environmental parameters. Space-based inertial sensors based on atom interferometry are a compelling technology for both technological and scientific applications because of the exceptionally high performance that can be enabled by long interrogation times with cold atoms in a microgravity environment.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
AOSense, Inc.	Lead Organization	Industry	Sunnyvale, California
 Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland



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Primary U.S. Work Locations

California

Maryland

Project Transitions



February 2012: Project Start



August 2012: Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/140287>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

AOSense, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Adam Black

Co-Investigator:

Adam Black

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Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



Technology Areas

Primary:

- TX17 Guidance, Navigation, and Control (GN&C)
 - └ TX17.2 Navigation Technologies
 - └ TX17.2.3 Navigation Sensors

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System